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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,885	04/09/2004	Hideki Watanabe	2004-0553A	9260
513	7590	05/23/2005	EXAMINER	
WENDEROTH, LIND & PONACK, L.L.P.			HITESHEW, FELISA CARLA	
2033 K STREET N. W.			ART UNIT	
SUITE 800			PAPER NUMBER	
WASHINGTON, DC 20006-1021			1722	

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/820,885

Applicant(s)

WATANABE ET AL.

Examiner

Felisa C. Hiteshew

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date see attached paper.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
- 2.

Information Disclosure Statement

The PTOL 1449 has been received, reviewed and considered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
 5. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota, et al.
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Kubota, et al teaches an apparatus and method for fabricating a single crystal semiconductor, comprising a main chamber (1), a quartz crucible (3) for reserving single-crystal silicon material and a graphite crucible (4), which is capable of rotation and elevation, is arranged on a crucible spindle (5). Around the crucible (4) are provided with a ring heater (6) and a thermal preserver (7). The upper portion of the main chamber (1) is connected to a pull chamber (10) through a connecting chamber (8) and an upper chamber (9). A seed holder (12) is appended to a wire (11), which is pulled by a wire driver. The exterior of the pull chamber (10) has an elevator (14) and two shaft (16) which can be elevated along a guide rod (15) and are supported by a supporter (17). The shaft (16), supporters (17 and 18) and an after heater (19) are all made of graphite. As controlled by an electrical controller and through the shaft (16) and supporters (17 and 18), the high frequency power or hot resistance of the after heater (19) heats a specific region of the single-crystal silicon to a predetermined temperature. Other elevators can be arranged around the after heater (19) for elevating a cone-shaped thermal shelter (20). The elevator (14) is driven to raise the after heater (10) when the polysilicon blocks are changed in the quartz crucible. The thermal shelter (20) is then also elevated, therefore, providing a space formed over the crucible (3) for preventing the interference between the polysilicon material (22), the after heater (19) and the thermal shelter (20). A thermometer is provided for detecting the temperature of the after heater (19) that is sent back to the electrical controller, thereby retaining the after heater (19) in a constant temperature. The temperature of the single-crystal silicon therefore reduces gradually from 1200°C to 1000°C, as the after heater (19) heats a

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specific region thereof. Moreover, the thermal cycle which is determined by the temperature and location of the after heater (19) can be programmed in an electrical controller. Therefore, the settings of the program is adjustable as the pull length of the single-crystal silicon varies.

The difference being that Kubota, et al does not exactly teach a first and a second opening for allowing the seed crystal to pass through, the diameter being set within the range of 1.25-3.0 times the diameter of the seed crystal, wherein the ratio of the heating strength of the vertically upper area to the heating strength of the vertically lower area is set within the range of 1:2.0-5.0 and the heating power of the heating section is set within the range of 30-80% of the heating power. However, in the absence of unobvious results, it would have been obvious to one of ordinary skill in the art to modify and optimize the apparatus teaching, as taught by Kubota, et al, since the after heater, elevator, thermometer, thermal shelter can be programmed and adjusted by the electrical controller. The motivation being that the apparatus responds immediately to the degradation of the graphite furnace and environmental variation inside the furnace, such as the variation of pulling conditions, by modifying the location of the after heater and its output power. The after heater thereby reduces the temperature gradient thereof and improving the quality characteristics related to the thermal cycle, such as the oxide film strength, amount of oxygen precipitation, and bulk defects.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill might reasonably infer from the teachings. In re Opprect 12

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USPQ 2d 1235, 1236 (CAFC 1989); In re Bode 193 USPQ 12; In re Lamberti 192 USPQ 278; In re Bozek 163 USPQ 545, 549 (CCPA 1969); In re Van Mater 144 USPQ 421; In re Jacoby 135 USPQ 317; In re LeGrice 133 USPQ 365; In re Preda 159 USPQ 342 (CCPA 1968).

Art is analogous when it solves the same problem as applicant. In re Melvin 165 USPQ 168 (CCPA).

Expected beneficial results are evidence of obviousness, just as unexpected beneficial results are evidence of unobviousness. In re Novak 16 USPQ 2d 2041 (Fed. Cir., BPAI 1989); In re Hoffman 194 USPQ 126 (CCPA 1977); In re Skoll 187 USPQ 481 (CCPA 1975); In re Skoner 186 USPQ 80 (CCPA 1975); In re Garshon 152 USPQ 602 (CCPA 1967).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Felisa Hiteshew whose telephone number is (571) 272-1463. The examiner can normally be reached on Mondays through Thursdays from 5:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech, can be reached on (571) 272-1137. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-1463.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public

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PAIR. Status information for unpublished applications is available through

Private PAIR only. For more information about the PAIR system, see

<http://pair-direct.uspto.gov>. Should you have questions on access to the Private

PAIR system, contact the Electronic Business Center (EBC) at 866- 217-9197

(toll-free).


FELISA HITESHEW
PRIMARY EXAMINER
AU 1722